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SOUL PARALYSIS.*

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One of the problems in neuro-pathology and neuro-physiology is that of the higher reflex acts. The cortical reflex arc by which a spontaneous or voluntary act becomes possible, is necessarily complex. The motor section of the arc is rather simple, but the sensory is very complex. General and special sensations, skin, muscle, bone impressions, and impressions from the eye and ear especially, but even those of smell and taste, all convey stimuli to the cortical motor areas and influence motor acts. It is possible therefore to interfere with spontaneous motor acts by interfering with the conveyance of sensory stimuli or by destroying the memory pictures of sensory impressions. We know in the more simple reflex acts that the consummation of the act is interfered with if the medium which conducts the sensory stimulus is destroyed.

Does the same hold good in the sphere of the higher psychic reflex acts? Could the development of motor activity in a fully developed nervous organism be entirely prevented if it were possible to prevent any sensory stimuli from reach-

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ing the psychomotor area? Could we produce complete motor paralysis of the body by shutting off all general and special sensory stimuli? Could we by destroying, if such a thing were possible, the association tracts leading from the cortical areas for general and special sensation, to the cortical psychomotor areas, produce a complete absence of all spontaneous voluntary motor acts? We shall see that Munk answers this last question in the affirmative.

On the other hand, is it possible to produce an apparent motor paralysis, unilateral in character, by a destruction of the avenues of common sensation which lead to the motor area, this latter and its projecting fibers being intact? Physiologists are divided on this question. Mott and Sherrington answer in the affirmative, Munk in the negative.

Charles Bell¹ in 1826 knew perfectly the regulating influence of sensation on motion and the effect of the loss of muscle sense upon voluntary acts.

In "The Human Hand and Its Functions" he says: "Without the muscle sense we should not be masters of our own bodies, we could not command our muscles when standing, much less so when walking, running or jumping, if we were not in possession of the sensation of the condition of the muscle before we projected the act of the will," etc.

As early as 1886 Munk³ first used the term "Soul Paralysis." He produced in dogs, by extirpation of the sensory cortical area a form of paralysis very similar to what Bruns later on described as occurring in human beings.

Neurologists have put on record undoubted cases similar to the one which forms the subject of this paper, where a complete loss of voluntary and spontaneous motor power was present in cases presenting loss of sensation, central in origin, in the affected extremity.

Mrs. F. F., Aet. 47—married—3 children, one miscarriage. Has had no venereal disease. Four years ago typhoid—during third week had sudden attack of acute hemorrhagic non-purulent encephalitis with paresis of right side of arm and face, and well marked amnesic aphasia with slight paraphasia. The paresis disappeared; the aphasia, never completely. Two years later had an epileptic seizure; none since.

Four weeks ago had an apoplectic seizure without loss of con-

sciousness. I was called to see patient four weeks after attack. In the interval she had regained some power in leg, but arm had remained absolutely helpless. She has suffered much with pain in the right side of head, neck and shoulder, occasionally in the right arm and leg. These pains occur in paroxysms and are very violent. Independent of the disturbance of speech there is at times mental confusion. Patient complains of the fact, that when she lies in bed, she does not know where her right arm and leg are. This condition worries her very much.

Examination.—Mental condition good, is cross and complaining at times, but usually happy and cheerful. Refers to her arm and leg as to a second person; constantly calls the arm or leg she or he. Is able to speak, but not fluently; has lost knowledge of nouns; recalls the names of but few of the ordinary objects about her—if given the name repeats it readily at times, at others with some difficulty, for instance, always says can't for can—forgets the name almost immediately, often shows marked paraphasia. Invariably knows the nature and use of an object. Is unable to read, but recognizes letters, spells words, but does not pronounce the word. She does not recognize the meaning of words, because letters grouped into a word have no meaning for her. She has no functional disturbance of sight, no hemianopsia. Can neither read nor write.

Sense of hearing, taste and smell are normal.

Slight paresis of lower half of right side of face and tongue.

Complete analgesia on right side of face, arm as far as elbow, and over various parts of legs and side of chest.

Loss of muscle sense and sense of position of the limb is complete. Does not know where leg and arm are when they are covered by bed clothes, in such a manner that she cannot see them.

There is complete thermanesthesia of entire side. Astereognosis is well marked.

The right arm is completely paralyzed, has not moved at all during the four weeks since onset of trouble. The arm is flaccid, relaxed, reflexes are absent, upon being requested to move the finger or hand, was not able to make the slightest movement, although she made an attempt to do so, showing that she understood the request. Very often, later on, a request to move the right hand was answered by the movement of the left hand.

If the patient, however, was told to watch the doctor's hand and then told to repeat the movement, the movement could be executed at once. Then the apparently completely paralyzed hand was made to extend and flex the fingers and thumb, to spread them wide apart, and to flex and extend the hand on the second day. Inside of a week all the normal movements of the arm and fingers—flexion, extension—moving of arm and placing hand on head and elevating shoulder could be done, usually only after she first

saw the movements executed by the physician, and only then when she was told to watch the movement closely.

Patient can move the leg slightly, flex it in the knee-joint, but has made no attempt to walk. The foot is in the typical condition of foot drop. The patellar reflex is present, no ankle clonus. Babinski sign is present. The muscles are relaxed and the sensory disturbances about like those of upper extremity.

After four weeks she could make gross movements of the arm when asked to do so, extend the arm and place hand on head. But the other movement, of hands and fingers especially, were quickly forgotten and could not be executed at all, or only very slightly, unless she first saw them executed for her, then she imitated them clumsily, slowly and with hesitation. This is especially true of extension and flexion of fingers and thumb of hand and forearm and elevation of shoulder.

The leg has extension and flexion, there is typical foot drop, but this can be overcome when she sees flexion and extension of foot done, she can walk with assistance, but owing to the fact that she does not know the location of the leg, is forced to look at her foot and is constantly turning the foot in, stumbling over her own foot. She is in constant fear of falling. With closed eyes she is unable to walk at all, although she can stand when supported. After eight months the patient is in the following condition:

Face and tongue are normal.

The arm usually hangs along side of body, semi-flexed, the hand being usually held by the other hand, only on the rarest occasions are the right hand and arm used spontaneously, the left hand being used on all occasions for the ordinary wants. By a special effort of the will patient has fair use of hand, fingers and arm. The finer movements, however, such as threading a needle, holding pencil, are very imperfect. All movements are less perfect with closed eyes or if done out of her ordinary routine. Reflexes somewhat increased, muscular power almost normal, temperature sense defective, muscle sense and sense of position of limb almost absent. Marked astereognosis.

Patient is unable to imitate with the normal arm any passive movements made in the paralyzed arm, but is able to imitate all movements of the normal arm with the paralyzed arm.

The leg is dragged in walking like a hemiplegic leg, no ankle-clonus, no Babinski; loss of temperature, muscle sense, etc. Same as in arm. Slight motor weakness. Fear of falling and hesitation in walking still present, foot drop gone.

Since Bruns (4) was the first to present this subject in a systematic way I should like to introduce a short synopsis of his case:

Patient was a male, aet. 60. Sudden onset, without loss of consciousness.

Résumé—Sensory aphasia (Wernicke), alexia, agraphia, mild

paraphasia, with tendency to optic aphasia of Freund, right sided hemianopsia, right sided diminution of sense of touch, pain, muscle sense, and sense of posture. Condition of motor function: An absence of real paralysis in right arm and leg, but the right arm is not used spontaneously for voluntary acts; lies as if paralyzed along side of patient; arm is used for reflex acts, like scratching and for unconscious acts, like bracing himself when arising from a sitting or recumbent position to a standing one. When shown how to make a movement, and especially when the movement is made passively in the arm several times, the patient is able to repeat it perfectly. These movements are then apparently normal, and not clumsily made, nor is it necessary for patient to control these movements with his eye. He is conscious of this defective condition and heaps abuse upon his arm, calling it vile names, etc.

Pathological Condition.—Softening of cortex and sub-cortical white matter of first temporo-sphenoidal, parietal lobe, gyrus angularis, and posterior portion of the internal capsule. The rest of the left hemisphere, including the psycho-motor area, is intact.

There are other cases on record, which vary somewhat from that of Bruns' case.

Bleuler's case (5)—Right hemiplegia, loss of sense of location of limbs, soul-paralysis, diminution of temperature sense, right hemianopsia, amnesic color blindness, alexia, amnesic aphasia.

Pathology.—Softening of left island of Reil, largest part of both central convolutions and adjacent cortex and subcortical substance.

In this case there was some motor weakness. Patient could execute movements only when seeing them.

Anton (6) has put four cases on record. In these cases the parietal cortex and the sensory tracts were affected.

Spaeth, Heyreard, von Zoemssen (7) in an article entitled "General Anesthesia" report two interesting cases. Spaeth's case fell as soon as he closed his eyes, and the other two patients ceased speaking when the ears were closed.

Spiller's case is not as typical as others above. He reports that patient had use of arm and leg, but did not use them. Autopsy showed meningitis in plaques of the parietal lobe (13).

The pathological condition underlying this peculiar phenomenon is rather uniform in all the published cases, viz.: a destruction of the cortex or the sub-cortical region of the parietal or speno-temporal lobes, or of the sensory tracts. In Bleuler's case the ascending frontal convolution, and the island of Riel were softened, but this case presented some motor weakness.

Bruns has named this condition soul-paralysis on account of its resemblance to Lissauer's soul-blindness, which is also due to a destruction of the association tracts between the optic center and the other cortical centers. Soul-blindness can only be partial, for in order that it may occur, it is necessary that the association tracts should be destroyed in the immediate neighborhood of the optic cortical center, and this necessarily leads to more or less destruction of the center itself, and to consequent cortical blindness, with contraction of the field of vision. Theoretically, the same might occur by destruction of these association tracts wherever they occur, but in practice, such extensive lesions are not seen.

Alexia is a partial soul-blindness, the letters and words are seen, but not recognized as symbols of language.

Optic impressions, however, are registered on bilateral cortical centers, and in order to have complete soul-blindness, it is necessary to have a bilateral destruction of these association tracts, from the optic area to all of the other sensory areas. Soul-blindness occurs, therefore, when with optic tracts intact and optic centers intact, visual impressions can reach the cortical optic centers, but are not recognized, because the necessary associative impressions are not at hand, owing to a destruction of the associative tracts. Let us contemplate how objects are recognized by sight. We see a red billiard ball; we at once know that it is red, round, hard, heavy and smooth. By means of our sense of sight we see only red, and circular; in order to know that it is round and smooth, we must call into play the sense of touch; that it is hard, and heavy, the muscular sense; and that it is cold, the temperature sense; and that it is a billiard ball, our previous optic impression.

All processes of the soul are similarly complex, consisting of impressions from all sensory centers. Intended voluntary muscular movements are equally complex, their fineness, precision, and in fact, very often their origin, are dependent upon preceding sensory impressions and knowledge which are, unconsciously, utilized in each movement which is made. If, therefore, the motor center and motor tracts are intact, but the sensory centers, or association fibers connecting the sen-

sory centers with the motor tracts are destroyed, the sensory irritations for muscular movements no longer reach the motor cortical area. There is a break in the higher sensory motor cortical reflex arc, and, a paralysis results, not due to a break in the motor section of this reflex arc, but in the sensory. Spinal reflex acts are possible. Spontaneous are not executed.

If this is true, why does not soul-paralysis occur in every case of cerebral organic hemianesthesia. In the reported cases, loss of sensation was always present, especially astereognosis, and loss of muscle sense.

As a matter of fact, in ordinary hemiplegia, with hemianalgesia and loss of thermic sense, and astereognosis, the phenomena seen in soul-paralysis are not observed. It is only when the muscle sense and the sense of posture in the limb are lost, that we observe a case of soul-paralysis. Why does this condition occur sometimes and not at others?

We all know from our clinical experiences that we meet with cases in which all the qualities of sensation are interfered with and no soul-paralysis results.

We know that loss of muscle sense alone, will not result in soul-paralysis. In Starr and McCosh's⁸ case of loss of muscle sense following the extirpation of a cortical tumor, the patient presented marked ataxia but no paralysis.

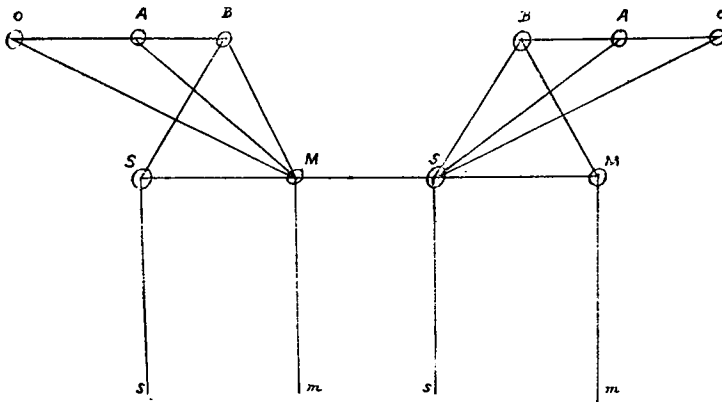
Strümpell calls attention to the fact that in syringomyelia we may have a profound loss of the temperature sense, and the sense of pain, with muscle sense, posture sense, and sense of touch intact, and the patient experiences no interference with the free use of the extremity. We see thus that the loss of any of the qualities of sensation, and in the majority of instances of all of them combined, is followed by soul-paralysis.

It is necessary that there should be a destruction of the association tracts, connecting the sensory centers with the other centers, not only the motor, but the higher psychic centers. When there is a loss of all association impulses from the sensory centers, the soul is not conscious of this portion of the brain, the higher cortical reflex arc is destroyed, and an apparent muscular paralysis results.

Tracts, however, from the optic and acoustic centers and

from the sensory centers of the opposite side through the corpus callosum, to the motor area of the apparently paralyzed side, are intact, and this explains the phenomena, that patients can make movements when the hand is seen, when they are commanded to make them, or when they imitate passive movements of the well arm with the paralyzed arm.

In the scheme, M m represent the motor centers and tract, and their destruction would be followed by a pure motor paralysis. Destruction of S s, the sensory centers, and tracts, would ordinarily be followed by hemianesthesia.



S s. Equal sensory tract and sensory centers.
 M m Equal pyramidal tract and motor areas.
 B. Represents consciousness.
 O. Equal optic areas.
 A. Equal acoustic areas.

B. O. A. represents respectively, the higher psychic centers, the centers for vision and hearing, if the association tracts S. B. connecting the sensory centers with the psychic centers, or according to Bruns also with the optic and acoustic centers are destroyed, soul-paralysis results.

The fact that passive movements in the well arm can be imitated perfectly with closed eyes, is due to the fact that sensory and motor impulses from the healthy side of the brain are sent by way of S. M. M. through the association tracts by way of the corpus callosum from the healthy centers of the normal hemisphere to the motor center on the diseased side. Pick calls this process hemiplegic parallelokinesie.

It seems to me that the condition resembles trans-cortical sensory aphasia, more than trans-cortical motor aphasia, although Pick's⁹ nomenclature of transcortical disturbance of motion is well chosen.

The resemblance to amnesic aphasia is very apparent. In amnesic aphasia, the knowledge of words is lost, but words can be repeated. So in soul paralysis, voluntary movements are lost, but can be imitated when seen. In amnesic aphasia, the words at first are quickly forgotten, but usually a fair stock is gradually regained, so also in soul paralysis, the movements are quickly forgotten, but afterwards they occur more or less spontaneously. And just as few cases of amnesic aphasia ever regain the use of language completely, so also in soul paralysis, the movements are never completely and perfectly regained.

A condition similar to organic soul paralysis was first described, by Duchenne, under the title of "*Perte de la Conscience Musculaire*." Similar cases were published by Lasegue, Strümpell, Bastian, Muller and Schuman, Goldscheider and Nothnagle. The most recent exhaustive article is by Fridel Pick, in which he also discusses organic soul paralysis and calls the condition transcortical disturbance of motion.

In order to present to you the subject of soul paralysis clearly, let us briefly review the mode of origin of a voluntary motor act in the child. At the moment of birth, the child is capable of nursing and swallowing, but these are purely sub-cortical reflex acts.

From the very beginning, numerous impressions stream in upon the brain of the child, through all the sensory avenues. These impressions are partly registered upon the cortex, where they are stored as memory pictures, partly pass along new paths to other parts of the surface of the brain. One of these parts is the motor area which is excited by these impressions, and reacts in its specific way, namely, with a motor act. The child first pays attention, then makes a movement. In the beginning these movements are awkward, but soon become more and more perfect, definite in their intention, until finally the child reaches for and grasps an object which

is held out to it. Up to a certain point this act is purely reflex, we soon notice that the child can choose to grasp or not to grasp. A psychic parallel has been added to the act. The child is conscious of the muscular act. This element of consciousness is also sensory in its origin. The child can be conscious of it through seeing the movement, and through the impressions which the movements make upon the sensory fibers of the joint surfaces, tendons, ligaments and skin. We have then the reflex act plus the element of consciousness.

In all highly developed nervous organisms the sensory impressions coming from general and special organs of sensation, need not necessarily be transformed at once into motion, but are stored away in the cortex until at the opportune moment they present themselves to our consciousness, and instigate motor acts. These latent simple impressions are worked up by consciousness into very complex thoughts. They are also capable of interacting upon each other, exciting or inhibiting and thus form the basis of our voluntary acts. When a voluntary act is performed as a result of an impulse of the will it is necessary that all the previous sensory impressions should be marshaled in their proper places, in order that the act may be performed quickly and with precision. The most important of all is that the memory picture of the act as a whole should be at the immediate disposition of the soul. Anything which interferes with this highly complex mechanism will interfere with the performance of the motor act, and we have seen that with the motor mechanism intact an apparently complete motor paralysis can result from a disturbance of the sensory section of this highly complex cortical arc. This condition has been called soul paralysis.

Recent experimental work in neuro-physiology has thrown new light on the subject of the relation of sensation to motion.

By improvement in the technique of operations, the researches in animal physiology have been better and more definite. Mott and Sherrington's researches had somewhat startling results. They experimented on monkeys. By cutting all the posterior roots leading to the extremities of one side, they found that the movements of the hand and foot were practically abolished. The movements of the arm and forearm, of

the leg and thigh were less interfered with. The arm hung useless from the shoulder, adducted, flexed at the elbow, and at the wrist—just as an arm that is carried in a sling; the leg was carried adducted and flexed, so as to free the foot from the floor when the animal ran; in climbing, both arm and leg were allowed to hang helplessly, and were not used. When allowed to become very hungry, the good arm being secured on the back, no attempt was made to take the food with the right hand, but the neck was craned forward, and the food grasped with the mouth. If the food was put in the anesthetic hand, no attempt was made to bring it to the mouth, the animal seemed unable to reach the hand to the mouth, even when urged to do so.

Interesting in the Mott-Sherrington monkeys is the distribution of the motor disturbances. It increased in proportion to the distance from the attachment of the affected extremity, being less marked at the shoulder and hip-joints, more marked at the knee and elbow, and motility was practically abolished in the hand and foot, especially so in fingers and toes. In this respect the disturbance of motion resembled that which follows the removal of the psycho-motor area, except that it was even more pronounced. When making exceedingly violent resistance movements the monkey occasionally used the fingers and toes, but never more than once or twice. As a result of these experiments Mott and Sherrington have come to the conclusion, that after loss of sensation in the extremities, the associated movements are not very much affected, but that those muscle-groups which are used for making the finer movements, complex, individual, and voluntary movements, movements for definite purposes (just those groups which are mostly represented in the gray matter of the psycho-motor area), are grossly interfered with, and practically abolished. They have come to the conclusion that the will is no longer able to make use of the muscle groups. After sensation has been abolished, the animal can no longer use the hand for grasping, and bringing food to its mouth, or use the foot and leg for climbing. Mott and Sherrington consider the lesion a permanent one, and conclude that not only the sensory centers in the cortex, but the entire sensory tract to the periphery takes

part in the voluntary acts of the body, and its integrity is necessary for the accomplishment of these voluntary acts; that centripetal sensory impulses, especially from the palm of the hand and the sole of the foot are necessary for the execution of the highest complex movements. They call attention to the fact that the animal *could* not perform these acts and not that it did not want to. They hold that this was the result of the fact that the animal was no longer able to form an idea of the act which it should perform.

Interesting in connection with this paper and a corollary to Mott and Sherrington's experiments on animals is Strümpell's¹¹ published case of total anesthesia of the right forearm and hand following a stab wound of the spinal cord. The defects are almost identical, at least as far as the hand and forearm are concerned, with published cases due to cerebral lesions. As a result of his case Strümpell concludes that the total loss of sensation renders the following voluntary acts impossible.

I. The limitation of a movement in space to a given degree (for instance, bending the forearm to a given angle).

II. Continued static fixation of the limb in a designated position (viz.: static coördination).

III. Rythmic, equal, slow movements to an extremity.

IV. Limitation of voluntary movements to isolated muscles, for isolated movements, viz.: movements of one finger with quiet fixation of the others.

V. The execution of consecutive movements, one after the other in proper order.

VI. The execution of complicated movements which call into play various muscle groups, which must act together, viz.: intended movements, occupation movements, writing, etc.

Strümpell holds that all these defects are atactic in character.

All these defects of movements are improved by optic coördination, but the latter can never replace the muscle-sense, etc., completely, for even with open eyes the above movements are defective.

Munk¹² repeated the experiments of Mott and Sherrington, and found immediately after the operation the same results

as the English investigators, but with this difference—Mott and Sherrington report, that after four months, the practical abolition of motion of hand and foot, remained unchanged, whereas Munk found that even on the very day of the operation, in some monkeys, but practically in all after a few days, that after persistent irritation, the animal soon began to use the anesthetic hand for voluntary isolated movements; that this use gradually became more and more constant; that although the animal always preferred to use the uninjured arm, it quickly and spontaneously used the anesthetic hand and arm when urged to do so; that it used this arm and hand for purposes of eating, and of cleansing itself, usually using it to assist the good arm and hand rather than using it in isolation, but that it would use it singly, and with a motive; but this improvement progressed only to a certain degree, and that the movements of the anesthetic arm were always characterized by an exaggeration, lack of precision and an awkwardness, which contrasted strongly to the well arm. He found, however, that the voluntary associated movements, such as are necessary for climbing, walking, running, were permanently lost or if any improvement were gained, it was of such a character and degree as to be of very little use to the animal.

He explains the difference in his results, in so far as they concern the voluntary isolated movements of the anesthetic arm, in his experiments as to those obtained by Mott and Sherrington, by the fact that the animal can make the movement, but does not wish to make it. If the food is so placed that the animal misses it in an attempt to reach it, it concludes that the movement is useless, and no longer attempts to make it. But if the food is placed in the anesthetic hand, and the monkey, as a result of the combined use of hand, and a stretching of neck and head forward, succeeds in placing the food in its mouth, it finds that the movement is successful, and continues to use the hand to bring the food to its mouth, and gradually becomes more and more proficient in the use of the anesthetic hand and arm.

Munk has thus shown quite a difference in the result of his experiments from those of Mott and Sherrington. That after resection of the posterior roots, voluntary associated move-

ments, such as are seen in walking running and climbing, are permanently lost, whereas, voluntary isolated, individual movement, made with special intent, are gradually regained, but never to a state of perfection or precision as before the operation. He has shown that just the opposite condition is found after extirpation of the "Fuhlssphere"—viz.: that isolated voluntary intended movements are permanently lost, whereas voluntary associated movements as in walking, climbing, running are retained, although with some awkwardness and lack of precision.

Munk claims that the conclusions drawn by Mott and Sherrington are not justified by the results of their experiments, that not only the cortex, but entire sensory tract from periphery to cortex, is active during the execution of voluntary isolated movements, he denies the law, that the loss of sensation leads to the loss of voluntary muscular acts; that while this law is true for the entire animal, and all its acts, it is not true for isolated extremities.

Munk agrees, however, that the integrity of the sensory tract, and the cortex are necessary for precision, and perfect adaptation of a muscular movement to the end intended, but not for the execution of the act itself, the voluntary act can be performed, but it lacks fineness and precision, even though there be complete anesthesia.

Munk explains the loss of isolated acts after cortical extirpation, on the ground that small definite areas of the cortex are necessary for their performance, but that associated movements, like walking, climbing, etc., can be performed because larger areas are called into play; they are done awkwardly and clumsily, because the cortical terminations of the sensory tract, and the beginning of the motor tract being destroyed, the centers are deprived of the exact knowledge of position of muscles and joints, as well as the nature of the floor or tree to be climbed, or the food to be grasped. He sums up the result of the loss of sensation on motion as follows:

The results are twofold, and are based upon two grounds.

All movements of the anesthetic extremity, which are the immediate result of a reaction to irritation of the sensory stimulations are no longer carried to, nor are perceived by the

central nervous system. Permanently lost, therefore, are all proper reflex movements, the common reflex movements, and the cortical reflex movements of the affected extremity.

All other movements of the extremity are damaged, are performed awkwardly, and clumsily, because of the lack of proper irritation of the cortex, by the sensory tract. Cortical, as well as spinal centers, are kept in a state of constant irritation, constant tension, constant tone, by communications brought to them from the extremities, even when in a state of rest, by the sensory fibers from skin, muscle, ligament and bone. The cortical motor centers are kept in a constant knowledge of the exact state of contraction of muscles, the position of limb, condition of joints, etc. This knowledge is necessary for prompt, accurate, and perfect executions of isolated as well as associated muscular acts, and when it is wanting, the act becomes awkward, imperfect, and incomplete. This is especially true of well ordered coördinated finer movements.

If this knowledge is wanting entirely, as it must be when there is total loss of sensation, the limb is not used, because the cortex of the brain has temporarily no knowledge of its existence, and hence, no attempt is made to use it. We know, however, that the sensory paths are reëstablished when once destroyed, and other areas of the cortex take on sensory functions, and therefore some use of the limbs returns.

My clinical case corresponds with Munk's physiological observation. The finer movements were regained, it must be admitted never perfectly, while the associate movements, except for walking, have not made much progress.

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